

## **Management of severe trismus with protocol of forceful mouth opening, under local anesthesia and sedation combined with physiotherapy**

**معالجة الضرس الشديد "تحدد فتحة الفم" بواسطة فتح الفم بقوة نسبية ، تحت التخدير الموضعي والتسكين الواعي جنباً إلى جنب مع العلاج الطبيعي**

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### **ABSTRACT**

**Back ground :**Trismus is pathological condition of muscle of mastication ; masseter , temporalis and medial and lateral pterygoid muscles that may affect patients who have undergone dental procedures ,radiotherapy , surgery and may be manifestation of psychiatric illness .trismus may affect oral hygiene , various dental procedures speaking , swallowing and may predispose for malnutrition. The aim of current study was to evaluate the effectiveness of forceful mouth opening under LA with sedation that accompanied by physiotherapy for patient suffering from severe trismus.

**Patients and methods:** Eight patients “ 6 women and 2 men “ were included in the study who meet the inclusion criteria. All patients presented with limited mouth opening with the maximal interincisal distance (MID) of less than 35mm which is used as a cutoff point to determine trismus . Forceful mouth opening with screw type mouth gag in the clinic under local anesthesia and sedation with subsequent regular exercise at definite protocol that practice at home .

**Results :** Patients attend the clinic with trismus that range between 5-16 mm. Frequent follow up of the patient for about 10 weeks demonstrate improvement of MID that range 24-37mm with the mean of “30.875”

**Conclusion:** Forceful mouth opening under LA with sedation for patients suffering from severe trismus ,in conjunction with physical therapy. Is safe and effective in increasing MID

**KEY WORD :** Trismus , screw mouth gag , interincisal distance

### **المخلص**

**المقدمة :** الكرز او ضرز " تحدد فتحة الفم الى اقل من 35 مام " هو الحالة المرضية لعضلات المضغ. التي تضم " العضلة الماضغة، العضلة الصدغية والعضلات الجناحية" و التي قد تحدث عند المرضى الذين خضعوا لعلاجات مطولة للأسنان ، العلاج الإشعاعي، والجراحة، وربما يكون مظهراً من مظاهر الأمراض النفسية. حالة الكرز " ضرز " هذه قد تصاحبها تأثير سلبي على نظافة الفم، كما يؤثر في مختلف علاجات طب الأسنان و تحدث او النطق لبعض الحروف والبلع وقد يؤدي لسوء التغذية.

الهدف من الدراسة الحالية هو تقييم فعالية فتح الفم بالقوة مع التخدير الموضعي والتسكين الواعي الذي يرافقه العلاج الطبيعي لمرضى يعاني من الضرس الشديد.

**المواد والأساليب:** ثمانية مرضى " ستة نساء ورجلين اثنين "قد تضمنت الدراسة من الذين قد استوفوا معايير الدراسة . كل المرضى كانوا يعانون من تحدد فتحة الفم والتي تقل عن 35 ملم الذي يستخدم كحد فاصل لتحديد الضرز.

تم في الدراسة فتح الفم بقوة معتدلة نسبياً باستخدام فم الفم في العيادة تحت التخدير الموضعي مع ممارسة العلاج الطبيعي بانتظام في بروتوكول محدد يجري في المنزل.

**النتائج:** بينت الدراسة بشكل جلي ان المرضى الذين عانوا من ضرز "تحدد فتحة الفم " التي تتراوح بين 5-16 ملم قبل بدا العلاج قد اظهروا تحسناً ملحوظاً من خلال متابعة المريض لفترة لاتقل عن 10 اسابيع وان هذا التحسن قد تراوح بين 24-37 مام مع متوسط "30.875"

**الاستنتاج :** فتح الفم باستخدام القوة تحت التخدير الموضعي مع التسكين الواعي للمرضى الذين يعانون من ضرز شديد، جنباً إلى جنب مع العلاج الطبيعي. هي آمنة وفعالة في زيادة فتحة الفم

## **INTRODUCTION**

The word “Trismus” is Latin term derived from the Greek word “Trismos” which means grinding / rasping. In lay terms Trismus means limitation of mouth opening due to reduced mandible mobility.(1) Normal maximal mouth opening, measured as the distance between the maxillary and mandibular incisors in healthy adults and its values are variable , while Nurhan Güler et al reported maximal interincisal distance MID of 46 +\_ 7 mm.(2). Mezitis M et al and Rieder CE et al demonstrate that normal range of mouth opening range between 40– 60 mm, although some authors place the lower limit at 35 mm(3,4) . Tveteras K, Kristensen S. report an extreme upper and lower limit of mouth opening to be in the range from 23 to 71mm as measured between the incisor teeth(5)

The finger have been used to estimate mouth opening , the width of the index finger at the nail bed is between 17 and 19 mm. Thus, two fingers’ breadth (40 mm) up to three fingers’ breadth (54–57 mm) is the usual width of opening. (1,6)The maximal interincisal opening (MIO) of at least 35mm is used as a cutoff point to determine Trismus. Less than 5 mm of MIO indicates complete ankylosis.(1) Changes in maximal mouth opening may reflect the impact of the disease activity, scar formation due to surgery or radiotherapy and the effects of interventions

(7) Impairment in mouth opening may have a detrimental effect on quality of life as basic functions such as chewing, swallowing, and pulmonary function may be affected. As well as effect on speaking , They also require extra care for maintaining oral hygiene(8,9). Many causes for trismus been listed and it include:

- 1.Elongation of the mandibular coronoid process which strikes against the zygomatic arch during mandibular movement that leads to painless difficulty in opening the mouth(10)
- 2.Local anesthesia injection(11,12)
- 3.Infection.( 13,14),Whether odontogenic or non odontogenic infection
- 4.Trauma(15)which may be sufficient to cause fracture of zygomaticomaxillary complex fracture or fracture of zygomatic arch alone or even fracture of the condylar process
- 5.Temporomandibular joint disorders, myofascial pain dysfunction syndrome MPDS.(15).
- 6.Submucous fibrosis. (15).
- 7.Dental procedures ,that may be due to inflammation of muscle of mastication or direct trauma to TMJ(16,17)
- 8.Malignancy in the vicinity(18.19)
- 9.Radiotherapy to head and neck(20) In irradiated patients, trismus results from fibrosis and subsequent scar contracture in the muscles of mastication (temporalis, masseter, medial pterygoid and the lateral pterygoid (19)
- 10.Hysteria (psychogenic)(21)

Trismus appliances are used in conjunction with physical therapy and are most effective when the condition is the result of muscle fibrosis or scar tissue that has not yet matured.(22) Many protocols for management of trismus were postulated and tried depending on the cause of trismus .Trismus appliance that has been tried and used are Therabite system , stacked tongue depressors, corkscrew devices, and the Dynasplint Trismus System(DTS).Those devices were used by different specialists , different institute with variable success rate (23,24,25,26)

The aim of study was to evaluate the effectiveness of forceful mouth opening under LA with sedation for patient suffering from severe trismus ,in conjunction with physical therapy in terms of mouth opening and patient satisfaction .

**PATIENTS AND METHODS**

Eight “6 women and 2 men “ patients were included in the study who met the inclusion criteria with trismus that present for 4-10 weeks.

**Measurements**

Measurement of mouth opening:

In patients with intact dentition the distance between opposing incisal edges of maxillary and mandibular incisors was measured using A millimeter scale with the patient seated upright ( occlusal and frankforte plane was parallel to the ).

The pain registration using VAS of 10 score while 0 mean no pain and 10 represent the most sever pain can man ever stand

**Inclusion criteria**

- 1.Healthy not pregnant lady or male.
- 2.Sound posterior and anterior teeth.
- 3.Adequate supervision by close relative.
- 4.Trismus that present for 4-10 weeks as max.
- 5.Trismus due to spasm of masticatory muscle with immature fibrosis.
- 6.Patient with follow up for at least 4 months .
- 7.The patient refused forceful opening of the mouth under GA.
- 8.Single session of forceful mouth opening under LA with sedation in clinic .
- 9.OPG for all patient was taken ,with close up view of TMJ was taken .
- 10.Clear medical history of any systemic diseases.

**Exclusion criteria**

- 1.Patients with a restricted mouth opening due to internal derangement of the temporomandibular joint or other intra capsular causes of trismus.
- 2.Limited mouth opening due to fracture of facial skeleton .
- 3.Limited mouth opening due to elongated coronoid process.
- 4.Any patient present with trismus of less than 4 weeks and more than 10 weeks.
- 5.Patient with trismus due to radiotherapy .
- 6.Patient with trismus due to malignant infiltrate to masticatory muscle.

**Methods :**

- 1.The patient on diazepam 5 Mg for at least one night before forceful mouth opening and continue afterward .
2. 2 hours before the forceful opening the patient was given tramadol tab 50 mg with diazepam 5 mg
3. LA injection for target area” painful spastic muscle “.
- 4.Forceful opening of the mouth using screw type mouth gag.
- 5.The patients return back home with instruction of using the tongue depressors which held for 1 minutes , which was performed five times per session. The stretching activities were repeated 6 to 10 times per day. The unassisted exercises involved opening the mouth to maximum interincisal distance, closing, and then moving maximally to the left, right, and protrusively. MID was measured pre-treatment, and subsequently there after in 2-week increments for a duration of 10 weeks. In addition, all patients were asked to subjectively rate pain, range of motion, well being, as well as compliance.
- 6.The patient was on analgesic “ ibuprofen 400 mg three times daily ” with peripheral muscle relaxant “myogestic also three times daily “
7. Frequent massage for masseter muscle and temporalis muscle.
- 8.Warm towel application for 5 minute that was repeated ten time per a day. In each visit the record of MID ,pain was recorded and the end of the 10<sup>th</sup> week the patient satisfaction was sought , for none satisfied group the author recommend management under GA with release of fibrous band and coronoidectomy.

**RESULTS**

Patient attend the clinic with trismus of MID “table 1” that range between 5-16 mm , with the mean of 8.375mm .In treatment day the net increase in mouth opening range between 17-27mm.With the mean of 21mm.The patient recall after 3 days ,two weeks ,4weeks ,6weeks ,8weeks and ten weeks after the procedures .

In the 3<sup>rd</sup> day we can see decline almost in all value of mouth opening ,with mean of 21.25 mm.

In the last week the gain in mouth opening varies between 17-28 mm with mean increase in mouth opening obtained was 22.25mm.

Three of eight patient were not satisfied with their mouth opening at the end of ten weeks ,while the remaining five patient were satisfied .

The pain registration “table 2 “ shown the patient in the day of procedures demonstrate spontaneous pain ranging from 2-6 with the mean of 4 with pain on clenching range from 4-9 with the mean of 6.5 . at the end of 10<sup>th</sup> week the spontaneous pain range from 0 – 2 with the mean of 1 and pain on clenching ranging from 0-5 with the mean of 2.5.

**Table 1 : demonstrate MID at the day of forceful mouth opening ,3 days ,2,4,6,8 and 10 weeks after with patient satisfaction**

Patie nt	Forceful opening day			1 <sup>st</sup> visit	2 <sup>nd</sup> visit two weeks	3 <sup>rd</sup> visit Four weeks	4 <sup>th</sup> visit	5 <sup>th</sup> Visit	6 <sup>th</sup> Visi t	Net gain MID	patien t satisfa ction MID
	1 <sup>st</sup> seen	MID after forceful opening	Net gain	MID 3 days	later MID	later MID	MID	MID	MID	MID	
1-F	6mm	23	17	17	20	22	22	24	24	18	S
2-F	7mm	29	22	20	27	28	29	29	29	22	S
3-F	11mm	33	22	22	34	32	32	32	32	21	NS
4-F	10mm	28	18	18	27	28	30	33	33	23	S
5-F	8mm	25	17	20	24	23	24	25	25	17	NS
6-M	5mm	29	24	19	25	31	32	33	33	28	S
7-F	6mm	33	27	26	32	34	34	34	34	28	S
8-M	16mm	37	21	28	34	37	37	37	37	21	NS
mean	8.375	29.625	21	21.25	27.875	29.375	30	30.875	30.875	22.25	

F=Female , MID =Maximal interincisal distance measured in millimeter Incisor

**Table 2: demonstrate pain level at intervals**

patient	At 1 <sup>st</sup> seen		2 weeks		6 weeks		Ten weeks	
	S	POC	S	POC	S	POC	S	POC
1-	4	8	3	6	1	2	2	5
2-	3	7	3	5	1	2	1	1
3-	3	5	3	4	2	4	1	4
4-	2	6	2	2	0	0	0	0
5-	4	4	4	4	2	4	1	3
6-	6	9	5	7	2	4	0	2
7-	6	6	2	5	1	2	1	2
8-	4	7	3	6	2	5	2	3
mean	4	6.5					1	2.5

S= Spontaneous , POC =Pain on clenching

**DISCUSSION**

Trismus is pathologic condition that may reflect the impact of a variety of active disease , condition or intervention (7) Or it may reflect a sustained contraction of muscle of mastication ; temporalis ,masseter muscle , or pterygoid muscle which yield connective tissue contracture resulting in restriction in mouth opening ( 27)

So Correct diagnosis and recognition of the cause is the key for the success of treatment (22)

The treatment of trismus should be directed toward elimination of the cause or causes .

Muscular problem and immature fibrosis were the major causes of limited mouth opening as proved in many studies ( 28).

Almost all patients in this study present with history of severe trismus of more than 4 weeks duration and less than 10 weeks that develop gradually with maximum inter incisal distance by far less than 35 mm which is the cutoff point to determine Trismus (1). And almost all patient also present with tender pteygo masstetric sling and anterior fiber of temporalis muscle.The mean inter incisal distance (MID) after forceful opening in the clinic was 29.625 while it decline in the 1st visit that occur after 3 days to 21.25. this can be attributed to pain associated wit inflammation after forceful opening of the mouth that occur in tense muscle of mastication that associated with breaking of some collagen fiber that responsible for contractures and this was reversed as we can see in the patient after 2week when the inflammation subside as the mean was 27.875.

Table 1 demonstrate clearly that there was almost steady increase in the MID from the 2<sup>nd</sup> week up to 10<sup>th</sup> week and this increase can be attributed to the use of heat therapy , analgesic , muscle relaxant ,physiotherapy and trismus appliance that soften and stretch the fibrous tissue , restore the circulation , increase muscular strength ,and improve the range of motion as proved by many studies (22,5)

At the end of the 10<sup>th</sup> week five out of eight patients were satisfied with their mouth opening in spite of their mouth opening range 24-34 mm which less than cutoff point to of trismus and this may be explained by improving the quality of life “chewing , speaking and improved oral hygiene” after the improvement of MID . This finding was supported by many studies that show considerable improvement in mouth opening following physiotherapy (23,25,26,29)

In the current study the increase in mouth opening was 22.25 which is considerably high and this is in accordance with P.U. Dijkstra et al who report 17.1 mm Increase in mouth opening (26) Buchbinder et al found in their study improvement by about 6 mm for people using tongue blade alone and about 5.4 mm for manual stretching of mouth opening (25).

The difference in the magnitude of increases in the MID between this study and other studies may be attributed to the cause of trismus of the previous study in which , radiotherapy and recurrence of tumor was the major cause of trismus which is very difficult to treat while in the current study , none have malignancy or radiotherapy. And this been supported by the study of Dijkstra et al who demonstrate clearly the mean increase in MID of 17.1mm and 5.5 mm for patients with trismus not related to cancer and in patients with trismus related to head and neck cancer respectively (26)

Three out of eight patient were not satisfied of their mouth opening , so surgical procedures under general anesthesia “G A” with release of fibrous band was scheduled for them.

Table 2 demonstrate the pain history throughout the treatment and we can see that pain decrease dramatically and steadily . the spontaneous pain decrease from 4 to 1 and pain on clenching decrease from 6.5 to 2.5 at the end of 10 weeks of the study .

This may be explained by breaking the cycle of muscular spastic trigger point that have been proposed by Simons et al (30), through stretching the spastic muscle by mechanical and medical aids help to decrease the pain dramatically.

## **CONCLUSION**

Forceful mouth opening with screw type mouth gag under LA with sedation for patient suffering from severe trismus , in conjunction with physical therapy. Is safe and effective method in increasing MID, that can replace forceful mouth opening under GA . for patient not willing to be exposed to GA .At the same time it is good way for relieve pain associated with myospasm .

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